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Combat Crew

Strategic Air Command **February 1984**

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Combat Crew

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On Our Cover

After two and one-half decades of magnificent duty, SAC's KC-135 fleet is ready for another quarter century of service to our country.

SACRP 127-1 VOL. XXXIV NO. 2 FEBRUARY 1984

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1984 —

Each new year many of us are inclined to look back and assess our gains and losses in the previous year. Our "report card" in the safety arena reveals that 1983 was a good year in many regards.

There were zero Class A ground launched operational missile mishaps — a superb achievement. The Class A flying mishap rate of **0.61** also represents one of the best in the history of the Strategic Air Command. These are the accomplishments of professionals and each of you can be proud of your contribution and the results.

But hold it. Before we get too cocky, there are some additional areas that also need our attention. While we were exercising self-discipline, sound judgment, technical proficiency and all the other ingredients that make up professionalism in our duty performance, we were also killing ourselves on the highways at an increasing rate.

SAC experienced 37 private motor vehicle fatalities in 1983. That's right, **37!** This represents an increase of 30 percent above the number experienced in 1982. Our motorcycle fatalities alone reflected an increase of 25 percent. Why? How can the same community of professionals who achieve such a strong safety record while on duty also inflict so much injury and death on themselves off-duty?

What we do not seem to know is how to convince ourselves that the professionalism our people are noted for in the execution of their military duties cannot stop as we exit the gate and hit the highways for a holiday weekend. We just do not seem to be able to convince ourselves that off-duty safety is serious business — deadly serious.

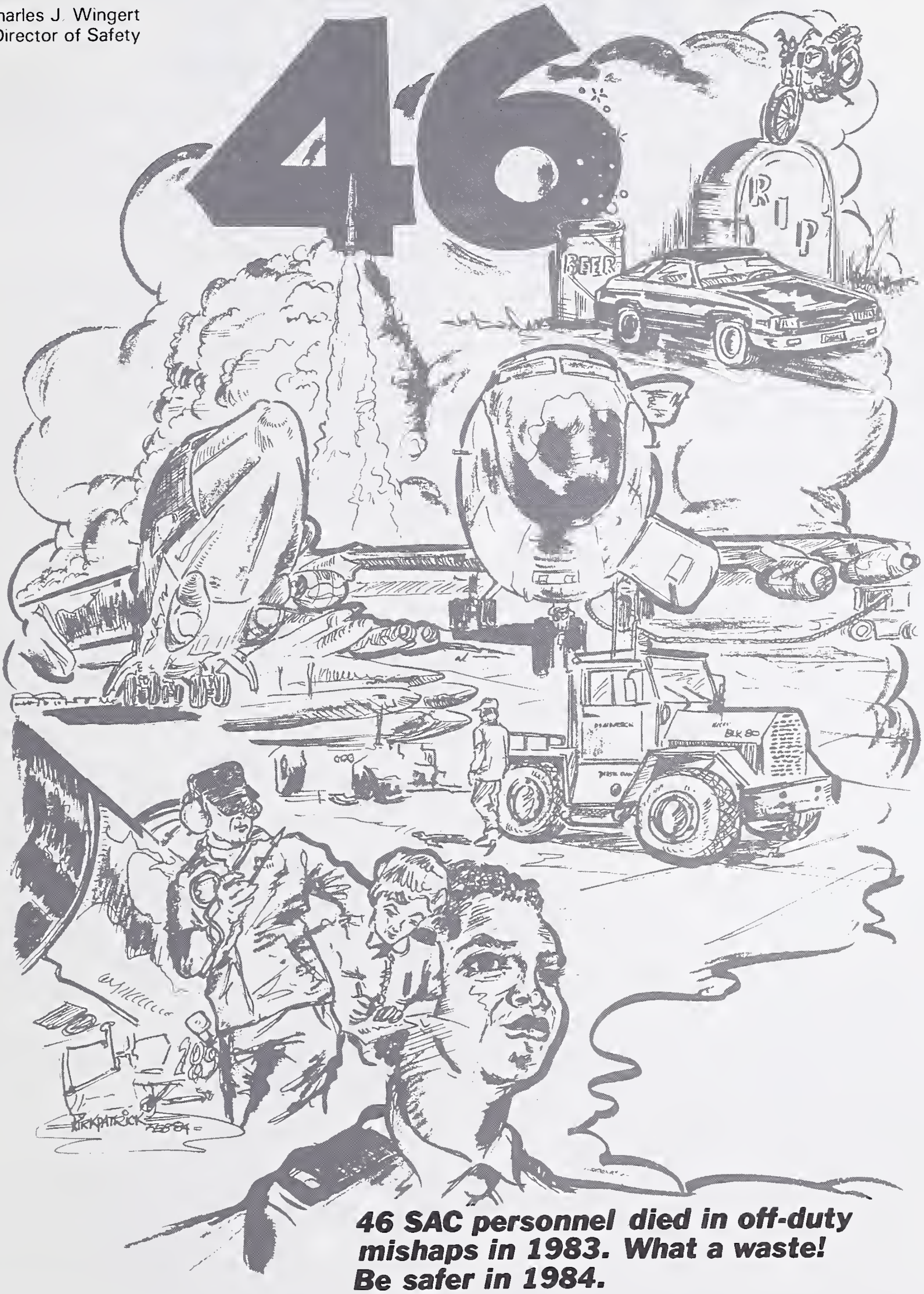
Commanders and supervisors grasp for slogans and gimmicks to make the point. We warn, admonish, even threaten — to get people's attention. We beat the drum for tech order compliance to ensure the safe, successful completion of a low level terrain avoidance mission and to ensure the safe deactivation of a TITAN II site. Why do we then seemingly throw the book out the window when we go off duty?

What can we say about safety in 1984 to make people think?

In the award winning TV series, Hillstreet Blues, many will recall that fine actor, the late Michael Conrad, in the part of the precinct supervisor, Sergeant Esterhouse. Every week he pressed home the critical point in instructing his police patrols as he said, **"PEOPLE, LET'S BE CAREFUL OUT THERE."** I can't say it any better.

WHAT CAN WE SAY ABOUT SAFETY?

Colonel Charles J. Wingert
HQ SAC Director of Safety



46 SAC personnel died in off-duty mishaps in 1983. What a waste! Be safer in 1984.

KINDNESS CAN KILL

"His student had died in the crash and there was no redemption. Early on, the student displayed a lack of natural flying talent. He should have been **'washed out'** rather than encouraged. But he was a pleasant and eager young man so he was given that extra chance. Lesson learned by his instructor. In the flying business, *kindness can kill."*

"Interesting point," mused the colonel, thinking over the passage in the book he was reading. "I guess it's true." The colonel had gone to bed early, a luxury his duties as wing commander seldom allowed. To relax, he was reading *The Aviator,* a new novel by Earnest K. Gann, one of his favorite authors. He continued reading until, at last, sleep overcame him.

Three a.m. is a lonely time. Only insomniacs and night shift workers are awake. The true early-risers will sleep at least another hour and the last of the night owls retired an hour ago. The colonel was now sleeping deeply in the soft, yellow glow of the bedside light with the open novel resting upon his chest. Suddenly, he was torn from his sleep by the sharp ringing of the phone next to his bed. Almost by reflex, he brought the receiver to his ear and muttered, "Colonel Hays."

"Sir, this is Captain Wills, command post senior controller; Charlie is on the line, too. Sir, our European redeployer is in trouble. He is having fuel problems and may not reach land before fuel exhaustion."

"How'd it happen?"

"Sir, I don't know. I received the information from the SAC underground and that's all they were able to tell me."

The colonel addressed his next remarks to the DO, Colonel Thomas. "Tommy, is this the crew you were so worried about?"

"Yes sir, I don't really know what to say."

"Well, never mind that, Tommy. Captain Wills, run a battle staff recall."

Within an hour, the command post was a flurry of activity. Aeronautical charts of the North Atlantic were hastily taped to the plexiglass boards which usually displayed the day's flying activity. The S-101 crew had set up a table immediately in front of the charts and were busily computing probable position, estimated time until landing; and, most importantly, time until fuel exhaustion. Every three minutes a new position was marked on the chart and time estimates posted on the chalkboard.

The wing commander wanted this information. It was his crew and his airplane. Like any good leader, he felt personally responsible for the shortcomings of his people. This particular weakness could cost an airplane and much worse, 55 passengers and crewmembers. The commander glanced around the conference table at his assembled battle staff, his eyes momentarily resting on Sam, his tanker squadron commander.

Sam knew how the "old man" felt. He felt the same way. The crew was from his squadron. Sam enjoyed being a squadron commander. He had a damned good outfit In the year since he assumed command, they had dazzled the IG, earning an outstanding rating. They had danced right through CEVG unscathed. It had not been easy, of course. One of his thornier problems was now at the center of everyone's attention, Mel Turner and his crew: Sam respected Mel a great deal. They had a lot in common. Besides an almost overly serious approach to their duties, both were enthusiastic about the Air Force, both loved flying, and both were exceptionally loyal to their superiors and subordinates alike. In this last trait, though, Sam now saw the fatal flaw which led both of them to this moment of impending disaster.

Somehow, under the previous commander, Mel had acquired a crew that was weak at its best. The co-pilot was happy-go-lucky and slow to improve. The navigator had potential, but not much else. He had done no navigating for two years after graduating from UNT, serving instead as an "airborne sensor operator." The boom operator was good, but a disciplinary nightmare. On Mel's crew personality conflicts were an everyday fact of life. However, in the past year Sam noted some improvement. He saw more attention to personal appearance, fewer troublesome incidents, and better test scores. Although they had squeaked by their last stan/eval ride, Sam was still uneasy about the crew's skill.

He had tried to talk Mel into splitting up the crew, but Mel saw this as an indication of personal failure and asked for more time to bring them around. Mel hated to have his guys split up under the cloud of suspicion that they couldn't hack it. Sam sympathized, and when he saw improvement, he rested easier. Then Mel's turn finally came for a TDY. After a lot of begging on Mel's part and serious soul-searching on Sam's, they were allowed to go. Besides, maybe the European flying environment would provide the right medium for them to finally "put it all together."

Fortunately, the TDY was uneventful and Sam was grateful. But the return trip had been a disaster. First, through gross fuel mismanagement, the co-pilot had inexplicably dumped an extra 20,000 pounds of fuel into the forward body tank, moving the CG forward, thereby reducing the aircraft's range. His reasoning, something about always having additional fuel available for transfer, did not make sense because they had no scheduled receivers. The biggest mistake was that they did not check the operation of the AR manifold to engine manifold valve after takeoff. The valve was frozen shut, trapping all body tank fuel. They would have made Goose Bay easily if the co-pilot hadn't dumped that 20,000 pounds into the forward body tank. The next mistake was failure of the navigator to consider the critical wind in determining a diversion airfield. With the unusually strong winds that day, Sondrestrom was the closest in air miles. But the nav's chart said Goose, so Goose it was.

The chalkboard told the story: 15 minutes until landing, five minutes until fuel ran out. As the seconds ticked by, Sam prayed they were wrong. The charts in the performance manual are notoriously conservative. Twelve minutes until landing, two minutes of fuel left. Maybe they dumped that useless body fuel and jettisoned cargo to get to a lighter weight. Hopefully, they put the CG back to 31 percent by dumping fuel. Eleven minutes until landing, one minute of fuel left. Perhaps they were using a step-climbing flight profile to increase their range. Ten minutes until landing, no fuel left. The base weather shop had predicted rough seas around Labrador. Sam tried to remember if a 135 ever ditched — and if there were any survivors. Nine minutes until landing. Sam prayed with each heartbeat, "God, let them make it." Eight minutes. "Please let them make it." Seven minutes. "Oh, God, please . . ."

Suddenly, the tense, silent sanctity of the moment was broken by the ringing of the telephone. The commander snatched the phone and shoved the receiver to his ear, his face ashen. "Yes . . . Oh my God, no. Casualties? I'll take care of it. Thank you."

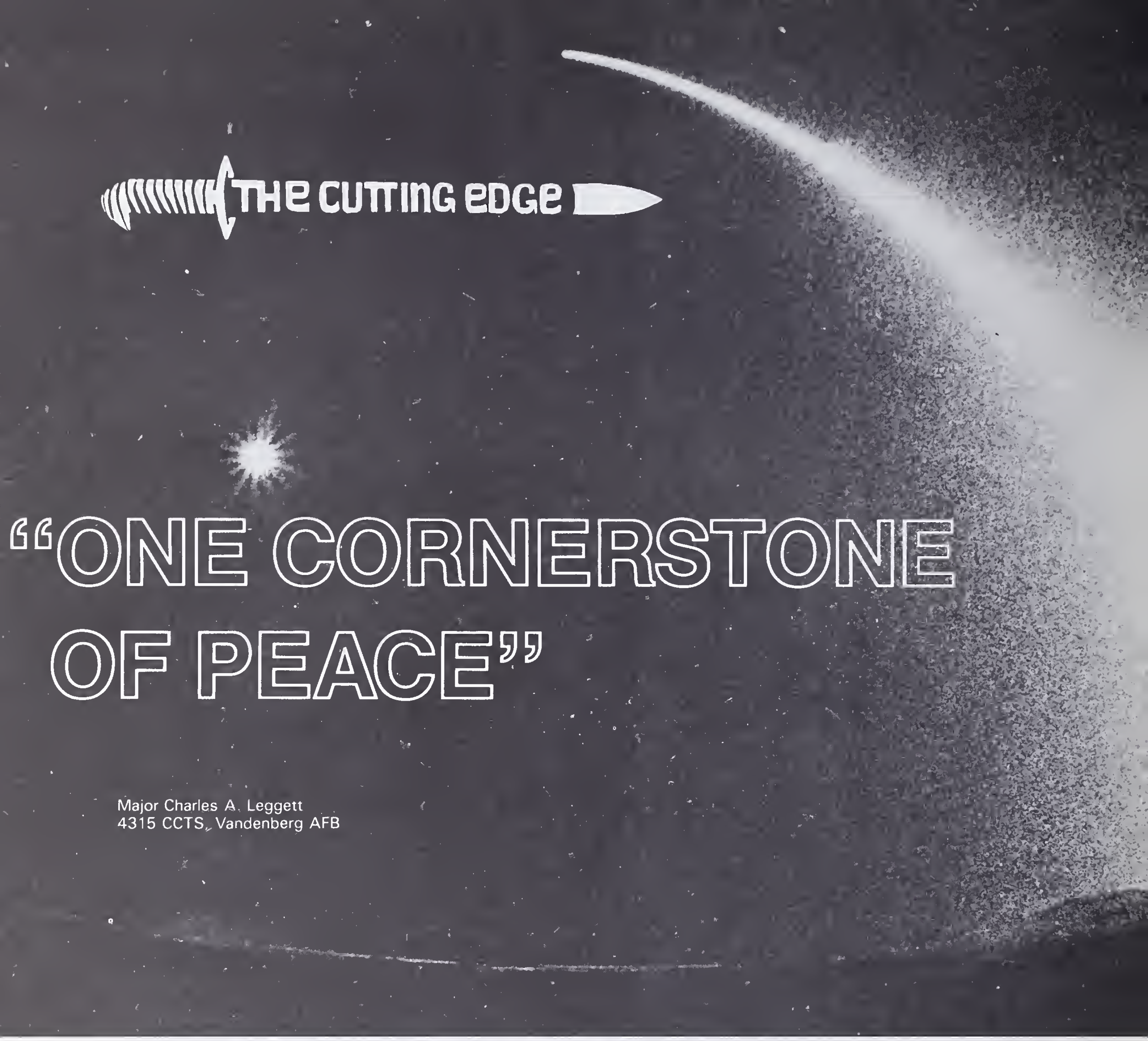
Sam knew the news was bad, but he prayed there were no fatalities. The commander spoke, "The HC-130 shadowing them watched them ditch. Seas were heavy. They disintegrated on impact. Only debris was visible, no bodies."

Men react differently to tragedy and shock. The normally jovial DO slammed his fist on the table and shouted, "Damnit, Sam. You knew that crew was weak. We should have broken that group up six months ago."

"Sir, I have no excuse. I misjudged the situation. I guess I knew that splitting the crew would have broken Mel's heart, but I should have done it anyway."

The wing commander had been focused on the telephone since he had delivered the news of the tragedy. Sam's reply made him remember the passage in the book he was reading. He muttered it without thinking, **"I guess it's true, in the flying business, kindness can kill."**

1Lt Tom Maloof
2 ACCS, Offutt AFB



THE CUTTING EDGE

"ONE CORNERSTONE OF PEACE"

Major Charles A. Leggett
4315 CCTS, Vandenberg AFB

It's your first alert as a deputy missile combat crew commander. You have practiced many times in the missile procedures trainer for that hopefully never-to-happen event of an actual emergency war order (EWO) launch. When you left your midwestern Air Force Base early this morning, the international political scene had reached new high levels of tension. All missile systems checked out okay this morning as you completed your daily changeover and inspection checklist. The nagging warble tone that routinely sounds, calls again. You immediately stop what you are doing and copy the encoded message. You are stunned by the EWO message you decoded. Apparently world situations have gotten worse! "Is this for real?" You ask yourself. You glance quickly at your seasoned crew commander. He returns the glance in silence as you both complete your well trained missile crew actions. The concern is written in his eyes. You both complete your checklist and insert the launch keys. A deathly silence seems to fill the launch control center. You wait.

As you wait, you begin to think. Only 10 months ago you were a college student in an AFROTC classroom studying to become an Air Force officer. And now the clock says 0215 and here you are, underground in a missile launch control center with your key in the launch switch and ready to copy the next EWO message. As you anxiously wait, minutes seemingly turn into hours. You ask yourself, "What if the next message calls for me to launch one of this nation's nuclear missiles? Can I do it?" Your mind races as you begin to recall what you learned in AFROTC about professionalism and the military officer. The words of General Douglas

MacArthur in his address to the cadets of the US Military Academy in May 1962 come to you, "Duty, Honor, Country." You now realize, as those before you, that at this moment in history you have the duty to be the ". . . custodians of the nation's defense, . . ." and have the honor to defend your country.

It's an awesome responsibility and not one to be taken lightly. You have been entrusted by the President of the United States and the people of this great nation to fulfill your assigned duty if called upon. You now begin to fully realize the responsibility those before you held when such slogans as "Give me liberty, or give me death," "Don't tread on me," and "I have not yet begun to fight" were spoken.

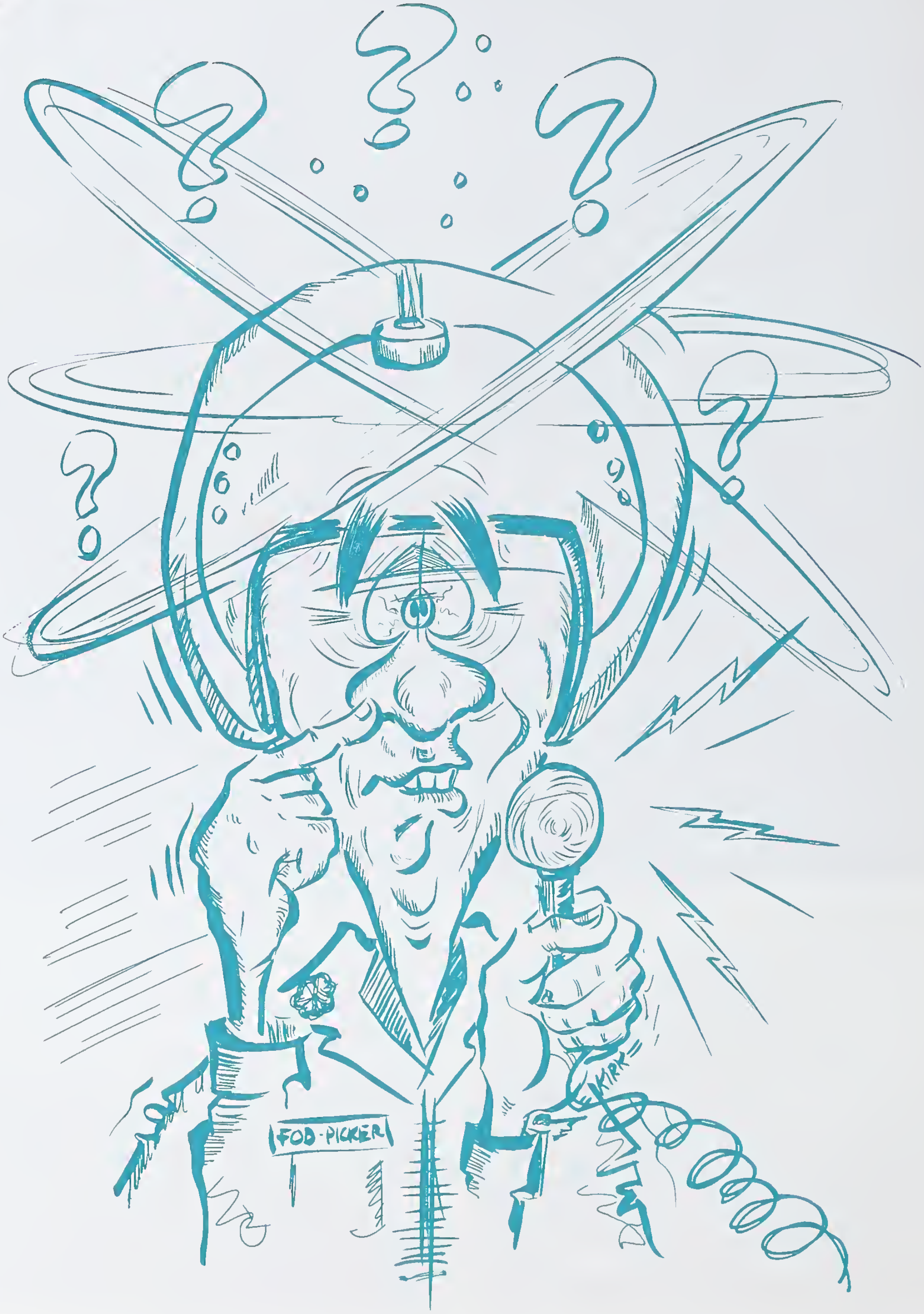
The threat to peace and survival is, unfortunately, as real today as it has been in the past. Peace is not a permanent, static situation. It requires continued effort on the part of the free world nations to maintain this peace. Unfortunately, not all nations of the world have the same philosophy or ideology about the definition of peace. It's a constant struggle. The two superpowers of the world have recently vied for hegemony in many regions of the world such as the Middle East, Central America, Asia, Europe and Africa.

Several factors can cause war. Economic conditions, extensive unemployment, poverty, ideology, and attempts to control the availability of natural resources are just a few. War can break out at anytime, anywhere, for a multitude of reasons. Today all world leaders must be men of highly rational and reasonable minds. The job of leadership can't be held by those who have less. The stakes are too high and the losses potentially too great. One fallacy of war, you recall, is the assumption that after a war has ended, the world situation will "most certainly" be better. This isn't always true. World War I was to be the war to end all wars. Is history about to repeat itself? Is war about to breakout once more? And if it does, this war will be like no other.

As you wait here in the LCC, you know you and the other missile launch officers in the Strategic Air Command are the front line warriors, the keepers of peace, and the first strike for a credible **deterrence.** You recall in your readings a popular anti-Vietnam poster that demonstrators paraded in the early 1970's, "Suppose they gave a war and no one showed up." You now understand such posters are a testimony to ignorance of Soviet policies on the part of the demonstrators. In your mind you presume the Soviets undoubtedly have a poster that says: "Suppose they gave a war and only **one** side showed up." That side would be the Soviet Union. But you are here. At this moment in time, you, the professional officer, have "shown up" to defend your nation. It's your professionalism, knowledge and dedication combined with that of all the other Air Force, Navy, Army and Marine men and women that make this nation's **deterrence** credible. Professionalism . . . dedication . . . belief in this nation . . . that's why we are strong. You know it. The Soviet Union knows it. You also know when **deterrence** fails, defense begins. You are ready to commit your full energy to the defense of this nation.

The warble tone sounds. You copy and decode the message. With a sigh of relief, you remove your key from the switch. History will not repeat itself today. You can stand tall. You are a proven professional officer. If called upon, like those who have served proudly before you, you will perform your duty. A confident, determined look works its way across your face as if Mr. Andropov himself were standing there next to you in frustration. He will not intimidate the United States of America. You know it, and so does he. And that's the "Cornerstone of Peace."

CROSSIFCHECK QUESTIONS



AND ANSWERS

During our first year we received hundreds of telephone inquiries covering all imaginable facets of instrument flying. Many of these questions deal with situations, techniques, and procedures which may interest you. Periodically we will review our question book and include some of the more pertinent questions and answers. We hope this clears up some of the grey areas.

QUESTION: AFM 51-37 says to "request maneuvering airspace if your heading is not within 90 degrees of the approach course and you must or decide to maneuver the aircraft into a more favorable alignment for an approach". What is maneuvering airspace?

ANSWER: The intent of AFM 51-37 is not to just "request maneuvering airspace." Neither Chapter 2 of FLIP GP (terms) or FAA manual 7110.65C (Air Traffic Control) define maneuvering airspace. Maneuvering airspace is an undefined term that means different things to different people. If the controller's interpretation is different from yours, confusion will exist and conflict could occur.

Use the following illustration and clearance requests as examples. See Figure 1.

The controller expects you to turn immediately in the shortest direction (left) to begin the approach. If you want to do something other than an immediate left turn, don't just say "SIFIC 01, request maneuvering airspace," — but request something that more specifically describes your intended routing.

(a) To turn right and parallel the outbound course prior to reaching the 270/30; request "to maneuver 'X' miles north of the 270 degree radial for alignment."

(b) To cross the fix and make a teardrop on the nonholding side; request "to maneuver 'X' miles southwest of the IAP."

QUESTION: Prior to departing base operations for a mission, I note a VORTAC used to define a fix on my route of flight is NOTAMed off the air. Must I change the fix?

DISCUSSION: From an ATC standpoint, the filed fixes only define the course. The NAVAIDS used to maintain this course are of little concern to controllers. On the other hand, it is the pilot's responsibility to maintain course, and it would be prudent to define fixes off operable NAVAIDS. A problem arises when operating on published routes, i.e., airways, jet routes, air refueling tracks, low level routes, etc. The ARTCC computer only recognizes the published fixes in conjunction with published routes. For example, the ARIP for AR-7B track is defined as the Red Bluff 099/76. Oakland Center's computer only recognizes this fix to define the ARIP. If the base ops dispatcher inserts any other fix, the computer will reject the flight plan.

ANSWER: It depends! When operating off published routes, if time permits, change flight plan fixes to reflect operable NAVAIDS. For published routes do not change the published fixes, but fly using alternate NAVAIDs for position orientation.

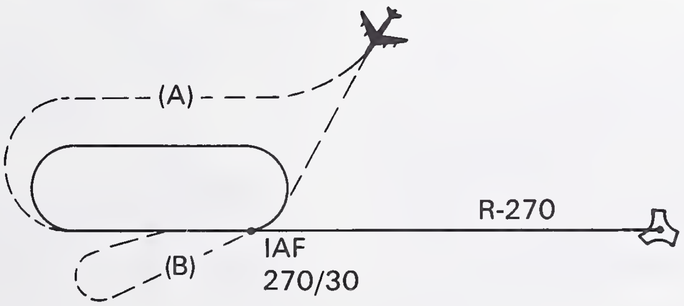


Figure 1

QUESTIONS & ANSWERS . . .

QUESTION: For VFR operations, AFR 60-16 requires us to be 500 feet below, 1000 feet above, or 2000 feet horizontal from clouds. For VFR flight in a control zone, AFR 60-16 further requires a minimum ceiling of 1500 feet AGL. How do these two statements interrelate and affect my operations in the VFR traffic pattern?

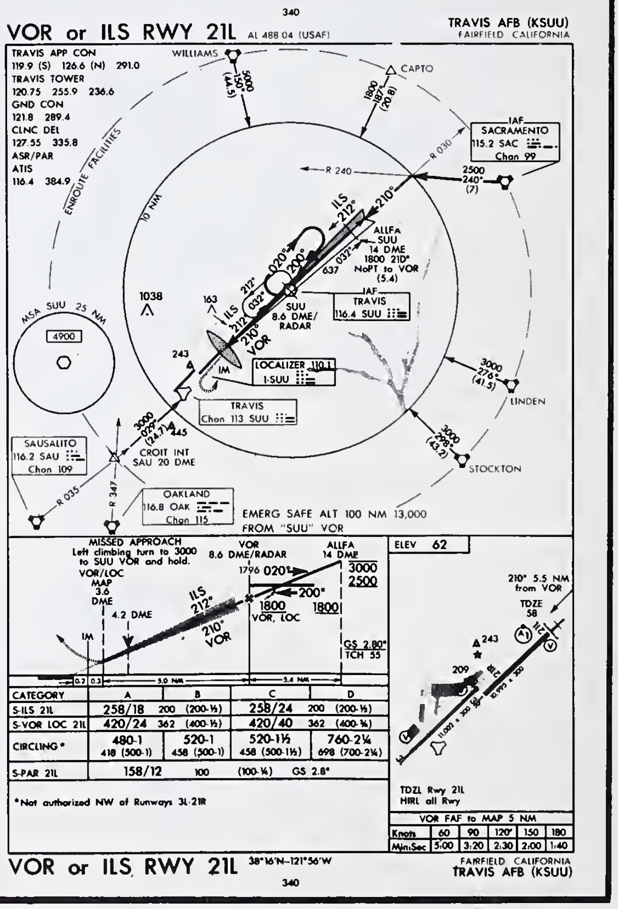
ANSWER: When operating in the VFR traffic pattern (assuming a control zone is published), we must comply with both statements. If the ceiling is 1500 feet AGL you must fly the VFR pattern no higher than 1000 feet AGL. Although most airfields have a published VFR traffic pattern altitude, it may be modified as necessary by the tower. For example, when the published VFR pattern is 1300 feet AGL and the ceiling is 1600 feet AGL, it is the pilot's responsibility to either request to fly the pattern at 1100 feet AGL, or not fly the VFR pattern at all.

QUESTION: I am approaching the Travis VOR from Williams VORTAC and receive the following clearance; "SIFIC 01, cross Travis VOR at 5000 feet, cleared VOR RWY 21L Approach". When may I depart 5000 feet? The Low Altitude Maneuver Comparison Chart (Fig. 6-11) in AFM 51-37 does not totally agree with the related text in the manual. See figure 2.

DISCUSSION: The VOR RWY 21L is a holding in-lieu-of procedure turn with a published minimum holding altitude of 1800 feet. AFM 51-37 (para. 5-5), tells us we are considered to be in a holding pattern at the time of initial station passage of the holding fix. Paragraph 5-9 further states, that once established in holding, you may descend to the published minimum holding pattern altitude when cleared for the approach (unless otherwise restricted by ATC). If we consider both paragraphs together, you may descend from 5000 feet after crossing the VOR. The Low Altitude Maneuver Comparison Chart (Fig. 6-11) is not in agreement with these two paragraphs because it states that descent may not be started until outbound abeam the fix. The chart was printed in error and is unduly restrictive because descent may actually be started after crossing the fix.

ANSWER: For holding in-lieu-of procedure turns, descent is authorized after crossing the holding fix. You may depart 5000 feet anytime after passing the Travis VOR.

Figure 2



QUESTION: Must I use the Low Altitude IAP booklets in the IFR traffic pattern?

DISCUSSION: When operating in the IFR pattern, unless you specifically request vectors to the final portion of a high IAP (example: "request vectors to HI-ILS final"), the ATC controller will vector you to and clear you for IAP's from the low book. This is reasonable when you think about it; after all, you are in the low altitude structure.

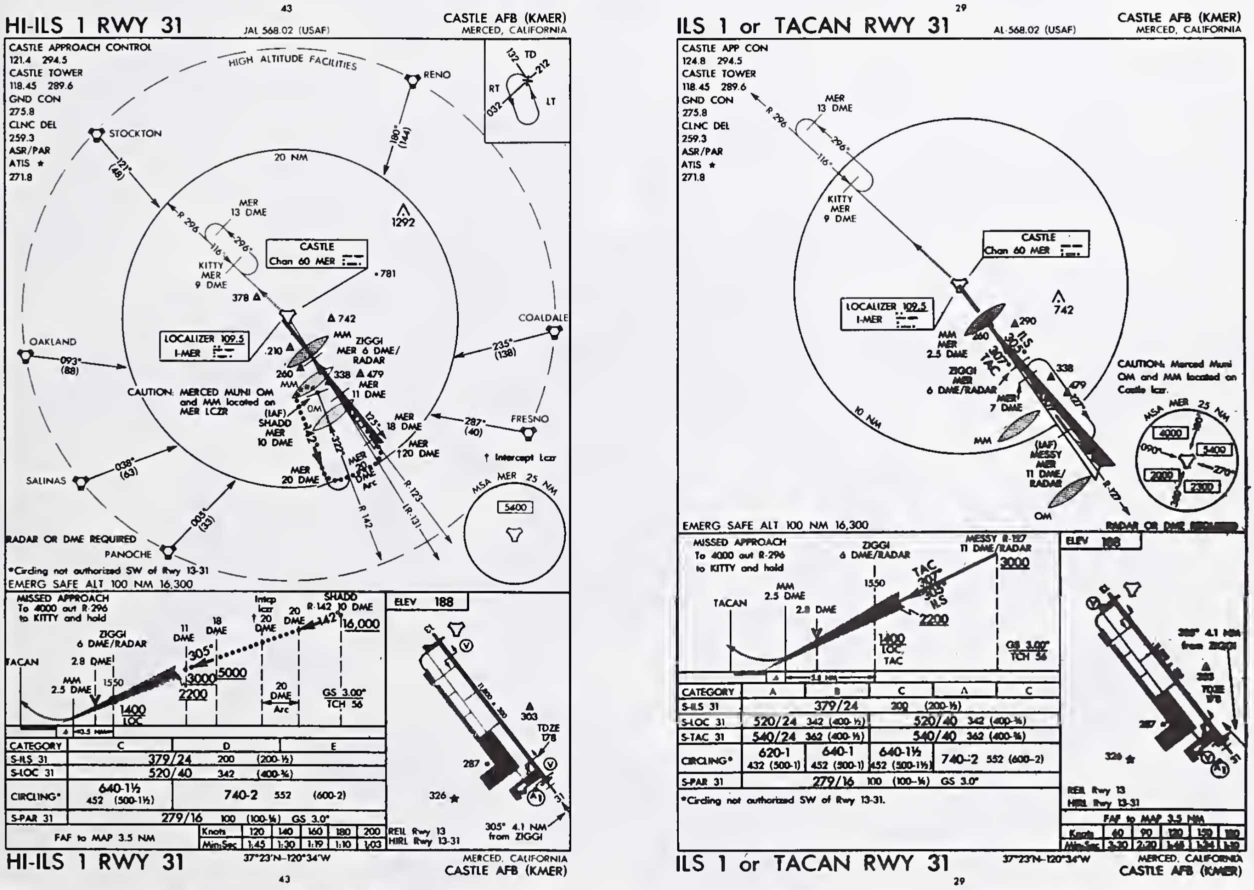
The vast majority of intermediate and final approach segments are the same in both books. However, it is not unusual for a low procedure to have fixes annotated that are not shown on the high procedure. For example, let's look at the High and Low ILS approaches at Castle AFB. See figure 3.

If we look closely at the two approaches it is evident that inside the 11 DME fix, the two approaches are the same. A common clearance in the IFR pattern would be, "SIFIC 01, turn left heading 280, maintain 3000 feet until the Messy DME fix, cleared ILS-1 approach." Using the high book, you would be hard pressed to find out exactly where the Messy DME fix is. Think this might cause you some unwanted confusion?

ANSWER: There is no directive that states which book you must use in the pattern. But, if you ask for "clearance for the ILS . . .," the controller will vector you to the "low" ILS final and the prudent pilot would have the low book handy. Remember though, if your aircraft category is higher than the highest published for the low altitude procedure, use the high IAP and request vectors to the final portion of the high approach.

If you have any questions about the above answers or any other instrument related questions, give us a call at AUTOVON 347-4571.

Figure 3



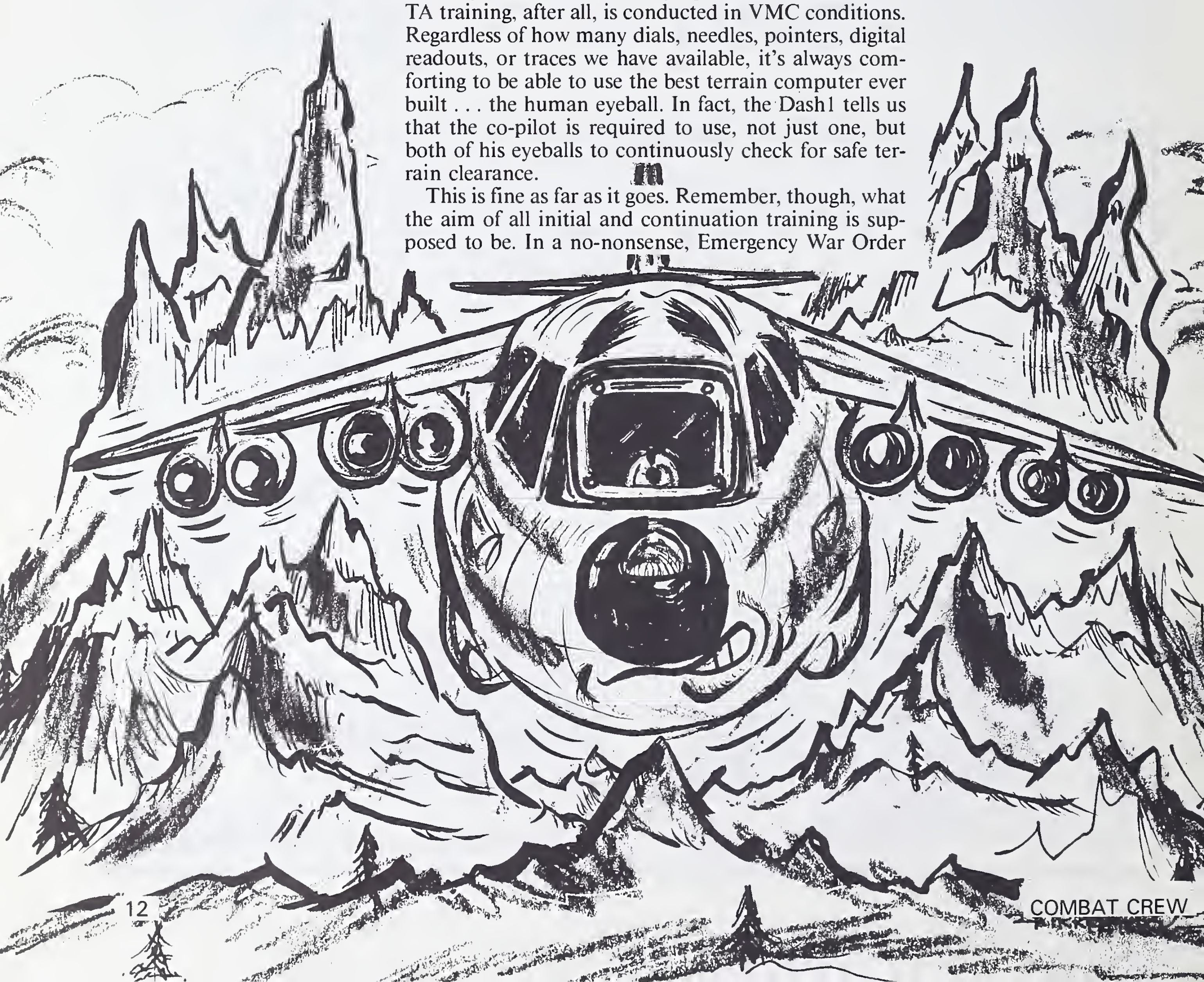
TERRAIN AVOIDANCE

"In the land of the blind, the one-eyed man is king . . ."

Maj Larry B. Lopez
CFIC, Castle AFB

The above sage expression serves not only as a memorable comment on life, but unfortunately also as a widely used approach to flying terrain avoidance. All TA training, after all, is conducted in VMC conditions. Regardless of how many dials, needles, pointers, digital readouts, or traces we have available, it's always comforting to be able to use the best terrain computer ever built . . . the human eyeball. In fact, the Dash1 tells us that the co-pilot is required to use, not just one, but both of his eyeballs to continuously check for safe terrain clearance.

This is fine as far as it goes. Remember, though, what the aim of all initial and continuation training is supposed to be. In a no-nonsense, Emergency War Order



Environment you will have to fly close to the ground, in a part of the world you've probably never been to before, without regard to weather, and with minimum reference outside the cockpit. With this in mind, one-eyed kings are invited to consider the following suggested techniques for TA flying.

The flight manual devotes more than just a little space to reminding us how important the radar altimeter is, and how important visual contact with the ground can be, and how the EVS symbology takes a back seat to the primary flight instruments. It also notes a number of disturbing system characteristics, including trace break-up, (that doesn't sound good), scan disparity, blind zones, radar shadows, poor display of sheer targets and also small targets, (read small mountains), weather effects, drop out, and the effects of bank angles, and so on and so on.

What are they trying to tell us? The section entitled "Planning Considerations" provides the first and most important clue. It states: "Careful planning is essential for safety and effectiveness." Think about that for a minute. The first step to successful TA flight is, indeed, pre-flight planning. I know it sounds timeworn and cliche, but take the time on mission planning day to review the low level route with your crew. If you are enjoying your first day of alert, this time is provided for you and since you cannot escape, **USE IT.** It is the closest you can come, from an EWO stand point at least, to flying the route visually. Terrain elevations, hidden hazards, and the general layout are the information blocks you need to know to successfully negotiate the route. Pay particular attention to terrain elevations of peaks, ridge lines and valley floors. Check for high terrain on either side of course, particularly at turn points since it may not be displayed on the terrain trace in the direction of turn. Note the general trend. Does the route start out flat and rolling with constantly increasing elevations, blending into foothills, then mountain ranges, or vice versa? What sort of pressure altitude will you be reading over various portions of the route? Over extremely rough terrain try to pick out the average ridge height. Note also the elevation of valley floors that you will be descending into after a peak crossing. Are there hidden ridges or peaks immediately behind the terrain you just crossed over, or does the terrain fall away rapidly? These considerations will make a big difference in how long you delay descent after cross over.

Once the route has been thoroughly assessed, consider your performance capability. The short look climb charts in the "G" or "H" model performance manual may be used to determine how much altitude you can gain in how much time. Let's consider the "G"model figures. The 300K Short Look Climb Time chart provides the most typical initial conditions for any given mission. Use your average gross weight for low level, or if you want a rule of thumb performance capability use 325,000 lbs as this value is midway between minimum and maximum gross weight for TA training. Entering the chart with an initial altitude of 0 feet, go to the STD temperature line, down to 3000ft of altitude change (you'll see why in a minute), across to 325,000 lbs, up to seven (7) engines (as a safety factor — you always lose an engine when you need it most), across to time, and read approximately 60 seconds time to climb. In other words, at a constant 300KTS with NRT set, and assuming the loss of an engine you can clear approximately 3000 feet in one minute. In an "H"model the computation works out to about 5000 feet. While this seems awfully conservative, think about negotiating mountainous terrain depending on a grainy, washed out, EVS monitor and a wormy terrain trace. One minute equates to roughly six nautical miles at low level airspeeds. It's comforting to have a hip pocket figure for climb capability when you are six miles from a ridge line that is 3000 feet higher than you are and you're trying to find a middle road between impacting the ground and exposing the aircraft to AAA or SAMs by a needlessly high crossing.

To be honest, most of the system limitations that are mentioned in the book will present little problem in flat and rolling terrain, particularly considering an operational EVS system which does much to enhance your penetration capability. It becomes a good deal more demanding, however, when you encounter the phase of TA flight that involves the performance computation we just made. That is, the approach to high terrain.

The manual states that the radar navigator will provide terrain assessments beyond the pilot's TA range, and that he will continue to advise until the pilot is tracking the obstacle on the terrain trace. The limit for depicting terrain on the TA set is approximately ten nautical miles. In the normal sequence of events you will be approaching the terrain in profile 3. The RN advises you of the high terrain and as a good technique he or the navigator should **provide its approximate elevation.** The pilot should then select profile 10, once the terrain is at that range, and determine the performance required by noting the pitch change necessary to make the HRL coincident with the trace. But, (and here's the big BUT), the manual also states that when viewed at ranges from five to ten miles, the change in aircraft flight vector required to clear most peaks may be very small. This could lead to the impression that the terrain is lower than it actually is. The most valuable pieces of information that the pilot has so far are: 1) the elevation of the obstacle, and 2) the range to that obstacle. As a back up to the range calls the pilot can note where his panel clock's sweep second hand was when the RN called the terrain at ten miles, and by using a wag figure of six miles a minute, select the appropriate range gate at thirty second intervals thereafter. Since the pilot is trying to fly as low as he possibly can, the range gate selection would be to profile 10 when the RN calls ten miles in order to check the trace, then back to profile 3, with a check at profile 6 about thirty seconds later, and then back again to profile 3. The question is, how long do you keep this up before you start following the climb commands that you should have gotten at profiles 10 and 6? That's a function of

continued on page 24

AN IFE WITH NO OPTIONS

Captain John Ley
68 AREFG, Seymour Johnson AFB

As a SAC copilot, there are three things I look forward to: left seat rides in the KC-135, CCRR, and ACE. The ACE program offers copilots the chance to spread their wings and enjoy flying in a relaxed atmosphere while practicing navigation and instrument skills. Since the T-37 is not our primary aircraft, there is a temptation to get relaxed in our study and knowledge of the T-37 Dash 1 and its procedures. After a recent inflight emergency, I'll never be quite so carefree about my remaining days in ACE.

Prior to departing the ACE office, we had coordinated for use of the local military operations area (MOA). Once at the airplane, I took the left seat and commenced the interior inspection while the other pilot performed the walk-around. We started with the power cart and had a normal start. When the battery was turned on, it indicated normal on the loadmeter.

When requesting our IFR clearance, we were told we couldn't get the MOA, so we decided to stay in the VFR pattern with tower while clearance delivery worked our request. The initial takeoff and touch-and-go were normal. On our second closed pattern, the other pilot told me my radio transmissions were "fuzzy," but not abnormal. As he did the next touch-and-go, his transmissions were fuzzy as well. We both sounded normal over interphone and could hear the tower controller just fine. We were cleared into the MOA following our fourth pattern.

Our entry into the MOA presented no problems. With only thin scattered clouds, it was a nice morning for some "yanking and banking." When we were ready to go home, I called center for clearance. I tried them twice and received no reply. Switching to another frequency, we tried again and still received no response.

Without warning, a two to three second dull buzz sounded in my earphones and then there was silence. I noted the DME off flag in view and realized things were too quiet. Nudging my buddy (the interphone was dead), we looked at each other and pointed to the off flags in our ADIs. Switching to spare inverter with no effect, it quickly became apparent that we had lost all electrical power. Flipping the battery switch off and on had no effect. Thank goodness it was VFR!

He flew the aircraft as I entered the checklist. Even though it was probably to no avail, we squawked "Emergency, 7700" on the IFF/SIF. As we descended towards home, I visually pointed out pertinent checklist items. Once we were below 10,000 feet, we took off our masks and tried to talk cross-cockpit. It was still difficult to communicate. We completed our descent and approach-to-field checks as best we could and continued home, constantly clearing. With five flying squadrons at the base and two victor routes going through the local airspace, there was great potential for a mid-air conflict. I reconfirmed our need to blow the gear down (no safe gear indications) and read through that checklist twice.

As we approached the north end of the base at about 4000 feet, we reconnected our oxygen masks in the interest of safety. (It would offer protection in the event of a bird strike through the canopy, and we would have oxygen immediately available should we get smoke in the cockpit.) We turned on the battery and had weak power for five to ten seconds before it went dead again.

After a thorough clearing of the local pattern, we entered initial. About a mile from the runway we began our descent to 500 feet and corrected towards the tower, complying with electrical failure procedures. Passing the tower, we cleared and pulled up into a closed pattern on downwind. I noted with approval the fire trucks rolling out of the fire station — our presence was known.

We slowed down and abeam the tower dropped the gear handle and then blew the gear down. The resounding "clunk" was reassuring. As we turned base, we both pointed out the green light from the tower indicating "cleared to land." We chose a no-flap pattern and speeds since we had no confirmation of flap setting. The elevator was trimmed for about 200 knots making pitch control a little more difficult and we had no thrust attenuators available for the faster go-around capability which they provide.

The final approach and landing went smoothly. Using normal braking, we stopped on the runway and shut down the engines. After inserting our seat pins we tackled the problem of manually raising the canopy. Surprisingly, it took two hands to move the declutch T-handle. (Perhaps years of non-use and some corrosion made it extra tough, although I didn't eat my Wheaties that morning.) We unbuckled and climbed out to meet the smiling faces of the fire department, the SOF, and Safety.

Maintenance towed the plane back to our ramp area while we completed paperwork and then we went off to discuss the emergency. The Dash 1 provided little help as to why we lost AC and DC power simultaneously. Maintenance informed us that circuit breakers on both voltage regulators were popped and the battery was completely dead. A talk with approach control revealed they had a skin paint on us and had cleared our route once they realized we were returning to the field. As I left the ACE detachment two hours later, I observed the sky was overcast. My mind was instantly troubled.

During our debrief, both ACE IPs had mentioned that under adverse weather conditions our only option may have been ejection. Naturally, we would use our nine minutes of attitude operation to assist in finding visual conditions to navigate, descend, and land, but if we couldn't have safely descended visually or flown off someone's wing to VMC conditions, our only option may have been ejection.

I don't like being without choices, so I began examining several aspects of this "no win" situation. I had over an hour's worth of fuel on board as well as an operational magnetic compass. Both engines were working fine, but should one or both flame out, I had no restart capability. My ADI would give somewhat accurate information for up to nine minutes without power. We were under radar control, so they might notice the disappearance of our squawk from scope and our radio silence. The Atlantic Ocean was 20-25 minutes east making a rapid change in weather a distinct possibility. With the MOA about 20 miles directly off the end of the runway, perhaps departing traffic might come within visual range and be attracted by our subsequent wing rocking.

Our main problems were communication and navigation. If we were in IFE conditions, we would need to fly on someone's wing to get below the weather and lead us to a runway. Without VFR conditions, our navigation would be limited to headings from the whiskey compass and timing — dead reckoning. It was communication that provided a bit of hope to this possible situation. In our parachutes were Emergency Locator Transmitters (ELT). We could have pulled the cord attached to the right front harness, setting off the ELT. With both air and ground personnel reporting the ELT, perhaps aircraft would be sent to the area trying to locate the source. I also wondered about turning it off and on as a signalling device to preclude ground personnel from thinking it was an inadvertent actuation. The ELT is packed in the upper right corner of the parachute. The pilot in the left seat could fly while the other pilot reached into the chute and turned it on and off. This would not compromise the ability to eject in a short notice situation. I'm not recommending one over the other — the important thing is that they are both options for communicating.

When we're not on a local sortie we wear a survival vest. I had never thought much about the survival radio until this incident. With two guard frequencies to talk on, plus the beacon, it's a superb asset. My only question was how the radio would work from inside the cockpit. During a later flight, I called approach control from about 20 miles out on the PRC-90 survival radio. While they could hear me fine, cockpit noise made their reply inaudible. In an emergency situation, I could at least explain my situation and request a chase ship.

The Flight Information Handbook provides for one more possible means of communication — the ground-timing triangles. By flying one minute legs and 120 degree turns, the triangle would hopefully be noticed by ATC personnel and alert them to the fact that an emergency existed. While I wouldn't count on this in a T-37, it might be appropriate while contemplating other courses of action or in conjunction with the ELT.

An inflight emergency, when properly handled, can be an excellent learning experience. I've gained some confidence in the FAA's system of flight following and ability to recognize and respond to an emergency. Additionally, I've learned that you can never know too much about your airplane and its life support equipment. Finally, I've come to realize that we, as flying crewmembers, have very few emergency situations where there are no options. If you think about and discuss potential situations on the ground before you go fly, you maximize your options in handling the situation and more importantly, **your chances of survival.**

APPROACH

Maj Gary A. Ambrose
46BMS, Grand Forks AFB

DO IT NOW AND
OR
WHEN "TLAR" WON'T

The Scene: One hot, sticky (or was it cold, frosty) afternoon, a squadron IP wandered down to the mission planning room between coffee breaks. Eavesdropping on an in-progress crew briefing, he overhears:

AC: "When we get back to 'the Forks' we'll shoot an enroute descent to an ILS, runway 35. If everybody'll look at page 49 of the High Northwest book, I'll brief the High ILS *penetration* to runway 35." (SOUND FAMILIAR?)

The Co was way ahead and already had the page out. The Nav found the page, carefully placed the book where he and the Radar Nav could see it, then went back to an article in "Airman" about police dogs in Germany.

The IP, on the other hand, couldn't believe his luck! Here was a situation *begging* for his sage advice — a chance to really show the troops what he knew!

IP: (Out-of-breath and salivating slightly) "Whoa, there, Pilot — if you're going to SHOOT an enroute descent, why don't you BRIEF one?"

AC: (Not just a little POed at the interruption) "Aw, we all know how to do an enroute, and besides, we can't PLAN one since we don't really know WHEN Center will let us descend. But, I'll go through the drill if it'll get you off my back."

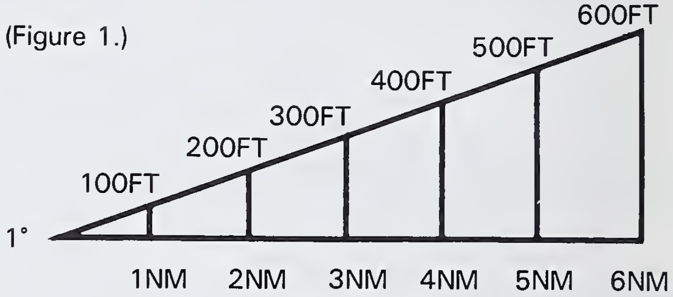
IP: (Now barely able to contain his excitement) "HA! Not only CAN you PLAN the enroute descent during mission planning, but it doesn't really matter WHEN Center lets you start. Let me just take a few minutes to show you." The EW looked at his watch, "With this long-winded *#!?*#', he thought, 'I'll never make that 1400 tee time." The Nav didn't mind — this stuff didn't apply to him and he wanted to finish the "Airman" article anyway.

The IP, starting to roll, now, continued:

IP: "I'm sure you've all heard of the 60 to 1 rule." He looked around the table. The pilot was concentrating on curling his upper lip into a silent movie sneer. The copilot now wore a glazed expression, and the IP could tell by the way the Nav's lips were moving he was still reading about K-9s overseas. It occurred to the IP that this could turn out to be more challenge than opportunity.

IP: "Well, maybe you HAVEN'T heard of 60 to 1, but no sweat — it's simple: 60 to 1 is a technique for establishing predictable pitch changes. It's based on this simple geometric relationship: For 1° of PITCH CHANGE, 1NM OF HORIZONTAL MOVEMENT PRODUCES 100 FEET OF VERTICAL MOVEMENT, *REGARDLESS OF SPEED,* as shown in this diagram:

(Figure 1.)



Therefore, 1°=100 feet per nautical mile (FT/NM)
2°=200 FT/NM
3°=300 FT/NM

And so on. An aircraft moving forward at 60 KIAS, or 1NM/MIN will, for a 1° pitch change, climb or descend 100 feet per NM of forward movement . . ."

CP: (Interrupting) "What if he's doing 120 KIAS?"

IP: ". . . For 1° of pitch change he still only climbs or descends 100 FT/NM, but his climb or descent RATE (VVI) is 200 FT/MIN, since he moves forward 2 NM in 1 minute and in 2 NM he moves vertically 200 feet."

AC: (Maybe a little interested) "So what's all this got to do with enroute descents?"

IP: "Glad you asked that! The flight plan you use for mission planning has all the information you need to plan your enroute descent: arrival altitude and ground speed. Also, you already know what altitude you're descending to — 2700 feet. All you have to decide is what gradient (pitch change) you want to use. Since 3° is close to a normal precision glide slope, I like to use 300 FT/NM (3°=300 FT/NM). Just divide the altitude you have to lose by your desired gradient, and that's where you start down: Let's say you're coming back at FL330, or 33,000 feet. You're descending to 2700 feet — let's make it easy — 3000 feet. So, 33,000 FT — 3000 FT equals 30,000 FT to lose. Therefore, $\frac{30{,}000\text{FT}}{300\text{FT/NM}}$ = 100NM (start descent point).

"Now you probably want to be down to pattern altitude about 10NM from the field, since, at

PLANNING:

AVOID THE RUSH

HACK THE PROGRAM

2700 FT, you'll intercept the glide slope about 7 or 8 DME, and the FAF for the localizer is at 6 DME. So, just add 10 NM to your completed start descent distance and you get 110 NM. Now you can brief WHEN you'll start down and what PITCH CHANGE you'll use. You can also pre-determine the VVI necessary to keep you on your descent profile (that is, what you have to initially set to get you down by 10 DME). Just multiply your gradient, in this case, 300 FT/NM times your planned ground speed in NM/MIN. For example, if your planned ground speed is 300 knots (300/60=5NM/MIN) then the required VVI is 300FT/NM times 5NM/MIN, or 1500FT/MIN. So, now you know you're going to plan to start down at 110NM and initially hold 1500FT/MIN."

CP: "Once we start down, how do we know if the descent is going as planned?"

IP: "Easy again. Anyone with a means to measure distance and altitude, including the Nav, can tell you how you're doing." The Nav looked up, "Say what?"

IP: "Using the same 3°, 300 FT/NM: If you are going to descend 300 feet in 1NM, then you should descend 3000 feet in 10NM. Therefore, every 10NM (DME if you're going direct to a TACAN) you should be 3000 feet lower. For example, if you start down from FL330 at 110NM, then at 100NM you should be at FL300, at 90NM FL270, 80NM FL240, and so on. You can brief this at MISSION PLANNING, too. As you descend, if you find yourself above or below your 10NM "milestones", it will only take minor pitch corrections to put you back on your planned descent gradient. Finally, if your ground speed changes as you descend, and it probably will even if you hold a constant indicated airspeed, you don't have to worry about it if you stick to your descent gradient — for example, 300FT/NM and 3000FT/10NM — since 1°=100FT/NM, REGARDLESS OF SPEED — (were you listening at the beginning?)."

AC: "This is all great if you start down where you planned, but what if Center holds you up at altitude until, say, 80NM from the field?"

IP: "No sweat! Just divide tie altitude to lose by the distance you have to lose it, or $\frac{\text{Altitude (FT)}}{\text{Distance (NM)}}$ = Gradient (FT/NM).

In this case, since you still want to be down at pattern altitude (2700FT) by 10NM from the field, you have 70NM to lose 30,000 feet. Therefore, $\frac{30{,}000\text{FT}}{70\text{NM}}$ = 428FT/NM.

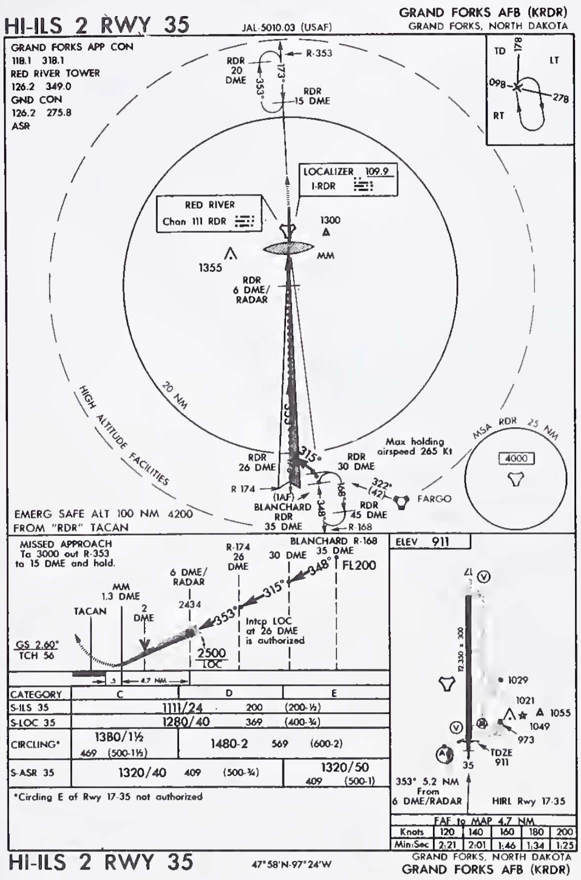
Your desired gradient is 428FT/NM (make it easy on yourself, call it 500FT/NM). This gives you the necessary pitch change (5°) and gradient (500FT/NM), so you're back in business. To figure the required initial VVI, just multiply your ground speed (NM/MIN) times the new gradient — for example, if your ground speed is 300 knots, or 5NM/MIN, then:

5NM/MIN X 500FT/NM = 2500 FT/MIN (Hint: you *might* need a drag device.) If the pilots get busy talking to ATC or running checklists, ask the Nav to do the few mathematical gymnastics involved. Finally, to update your enroute descent, just watch to see if you lose 5000 feet every 10NM. It's easy as that."

CP: (The glazed look gone.) "I'll bet we can use this stuff for published penetrations, too."

IP: "Absolutely — the approach plate *tells* you how much altitude you must lose and how much distance you have to lose it. In fact, you can and should compute descent rates on final for published precision and, particularly, non-precision approaches (to make sure you get down

continued on page 25



CATEGORY	C	D	E
S-ILS 35	1111/24 200 (200-½)		
S-LOC 35	1280/40 369 (400-¾)		
CIRCLING*	1380/1½ 469 (500-1½)	1480-2 569 (600-2)	
S-ASR 35	1320/40 409 (500-¾)		1320/50 409 (500-1)

*Circling E of Rwy 17-35 not authorized

FAF to MAP 4.7 NM					
Knots	120	140	160	180	200
Min:Sec	2:21	2:01	1:46	1:34	1:25

(Figure 2.)

KC-135 PILOT'S GUIDE TO PO
PARALLEL RENDEZVOUS*

***or everything you wanted to know about INS rendezvous but were too embarrassed to ask the nav.**

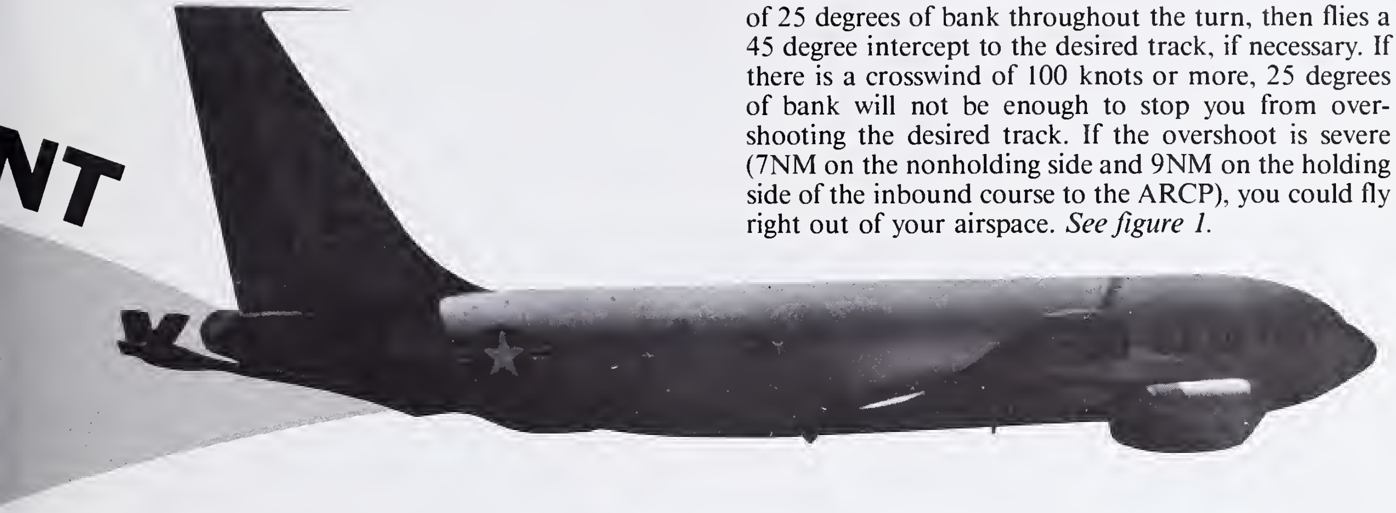
Captain John K. Meyers
1Lt Nancy R. Millspaugh
320 BMW, Mather AFB

The installation of the INS/DNS in the KC-135 has changed the way we fly. We saw the changes first in more accurate general navigation. Now, after over twenty years of using radar as the primary means of rendezvous, the INS/DNS has taken over as the primary method of maintaining offset, with A/A TACAN primary for range information. That's great because it's an extremely accurate system that can significantly reduce the entire crew workload. The only problem is that a lot of us "old head" pilots weren't reared on the magic of INS. This article will point out some techniques for pilots of the KC-135 for use of the INS for a point parallel rendezvous. Working on the assumption that you have a firm grasp of the basics of the INS, I'll take you from arrival at the ARCP through completion of the rendezvous; finishing with some ways to back up the system.

AT THE ARCP

Orbital Pattern Steering (OPS) provides an orbit delay at the ARCP when the INS is coupled to the autopilot. OPS allows the pilots and navigator to concentrate on the rendezvous instead of directing all their attention to maintaining an orbit within ATC assigned airspace. Employing the magic of OPS is actually very simple. There are really only two steps.

The first step is to insert the receiver's true track inbound to the ARCP. This track orients the INS to a proper orbit. The best time to insert the track is during preflight, by either the navigator or the copilot. Simply select the Range/Bearing (RNG/BRG) function on the CDU, depress the +6E key, and load the receiver's inbound true track. One point to remember here, if the receiver's inbound track is, for example, 062 degrees,



you must load 062000 into the right hand display of the CDU. In other words, move the inbound track to the left three digits of the display by entering three zeroes after the track. Next, hit the INSERT/ADVANCE key which will be illuminated.

The next step is accomplished while airborne with the autopilot coupled to the INS. When the ARCP is the point in the TO side of the FROM-TO display on the CDU, depress waypoint change and load "O O" in the FROM-TO display. Now you have an option. You can either manually insert OPS mode by depressing the INSERT/ADVANCE key, or let it automatically insert when the airplane is 41 seconds from the ARCP. In deciding whether to insert OPS manually or allowing the INS to auto-insert OPS, consider two disadvantages of the manual insert. First, there are unacceptable insertion areas if manually inserting. Insert OPS in some of these areas and you'll be doing figure eights on your way to the ARCP. Auto-insert occurs when 41 seconds (approximately 5NM) from the ARCP and will always provide a suitable entry and keep the airplane within ATC assigned airspace (except when crosswind component exceeds 100 knots). Second, once OPS is inserted, data such as distance and time to the ARCP is no longer displayed on the CDU.

So here you are, proceeding to the ARCP using OPS by first inserting the receiver's inbound true track, and then loading "O O" in the FROM-TO display when the ARCP is in the TO side. Be sure to check the AUTO-MAN switch on the CDU is in AUTO. Now what? As the airplane reaches the ARCP, it will turn, using a maximum of 25 degrees of bank, to intercept either the inbound or outbound leg of the ARCP. The orbit will have 15NM legs and will be 9NM wide. Including the turns, you'll have a left hand orbit approximately 9NM by 24NM. This is well within ATC assigned airspace. The airplane will continue this orbit as long as the "O O" function is inserted. However, if winds are very high (100 knot or more crosswind component), you could be blown out of the ATC assigned airspace during the turns. This is because the INS in OPS flies a maximum of 25 degrees of bank throughout the turn, then flies a 45 degree intercept to the desired track, if necessary. If there is a crosswind of 100 knots or more, 25 degrees of bank will not be enough to stop you from overshooting the desired track. If the overshoot is severe (7NM on the nonholding side and 9NM on the holding side of the inbound course to the ARCP), you could fly right out of your airspace. *See figure 1.*

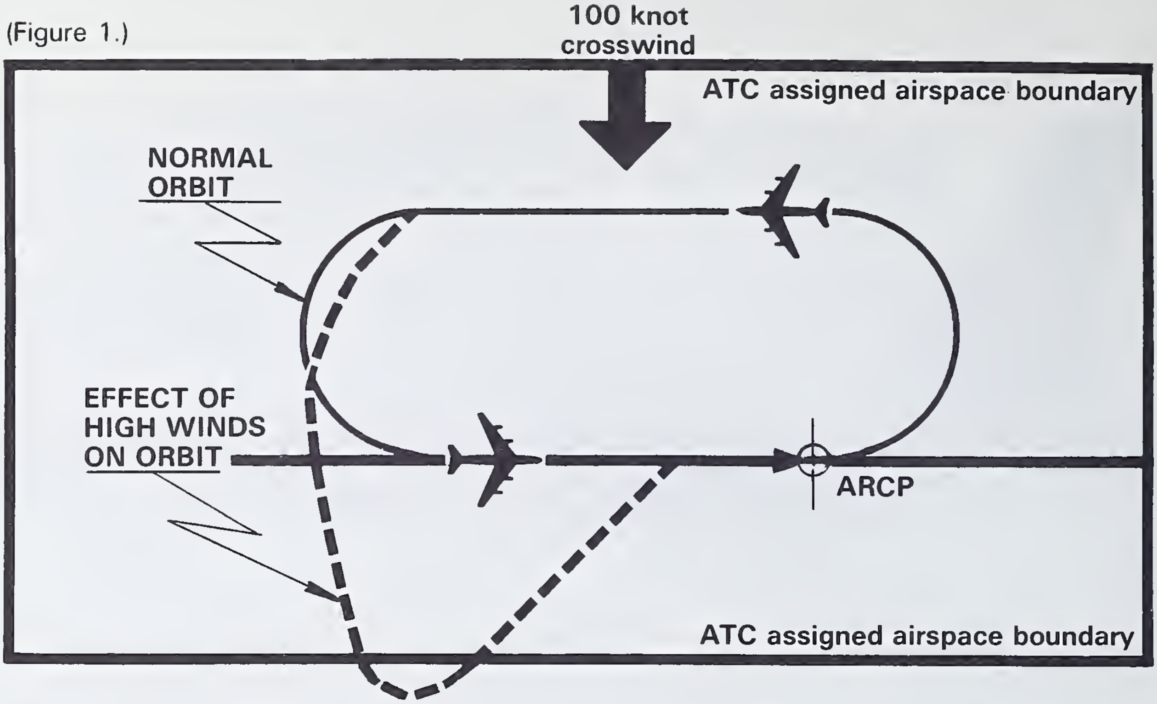
THE RENDEZVOUS

While orbiting, you can prepare for the turn you will have to make toward the receiver when he calls ARIP inbound. This turn toward the receiver is what the "5 5" function of OPS is all about. You load the "5 5" function the same way you loaded the "0 0" function. Simply depress the Waypoint Change key and load "5 5" in the FROM-TO display. The INSERT/ADVANCE key will now be lit. When the receiver calls ARIP inbound, insert the "5 5" function by depressing the INSERT/ADVANCE key if you are on the inbound leg to the ARCP. If you are in the turn to the inbound leg, you must wait until you have rolled out of the turn before inserting the "5 5" function. The "5 5" function commands an immediate left 180 degree turn to the reciprocal of the orbit leg you are on, so if you are already on the outbound leg heading toward the receiver don't insert it. Instead, hit the clear key. *See figure 2.*

Now you're heading toward the receiver and turn range and offset are computed by the navigator and checked by the copilot. Because the orbit is 9NM wide, you already have a 9NM offset. If the computed offset is 9NM, just turn the AUTO-MAN switch on the CDU to MAN. Now the airplane will maintain the 9NM offset and won't turn back to the ARCP at the orbit backside turn point. When the computed turn range is reached on A/A TACAN, disengage the VOR/LOC switch on the autopilot and turn toward the receiver using 30 degrees of bank to complete the rendezvous.

If the offset is different from 9NM, only a couple of more steps are needed. When wings are level heading toward the receiver, uncouple the autopilot from the INS by disengaging the VOR/LOC switch on the autopilot control panel. Leave the INS select switch ON. Insert the ARCP in the FROM side and the ARIP in the TO side of the FROM-TO display. Check the CDU data selection in Cross Track Distance/Track Angle Error (XTE/TKE) mode. The left side of the display now shows your offset while the right side shows the number of degrees of turn needed to maintain that offset. Remember that the right side display is Track Angle **Error,**

(Figure 1.)


100 knot crosswind
ATC assigned airspace boundary
NORMAL ORBIT
EFFECT OF HIGH WINDS ON ORBIT
ARCP
ATC assigned airspace boundary

so if you have established the desired offset and Track Angle Error shows 10L you must turn right 10 degrees to correct the error. Again when the turn range is reached, turn the airplane left using 30 degrees of bank to complete the rendezvous.

In either case, once established in the turn, depress Waypoint Change key and insert the ARIP in the FROM side and the ARCP in the TO side of the FROM-TO display. This swapping of waypoints will give you course guidance at rollout. Also make sure the AUTO-MAN switch on the CDU is again in AUTO position.

BACKING UP THE SYSTEM

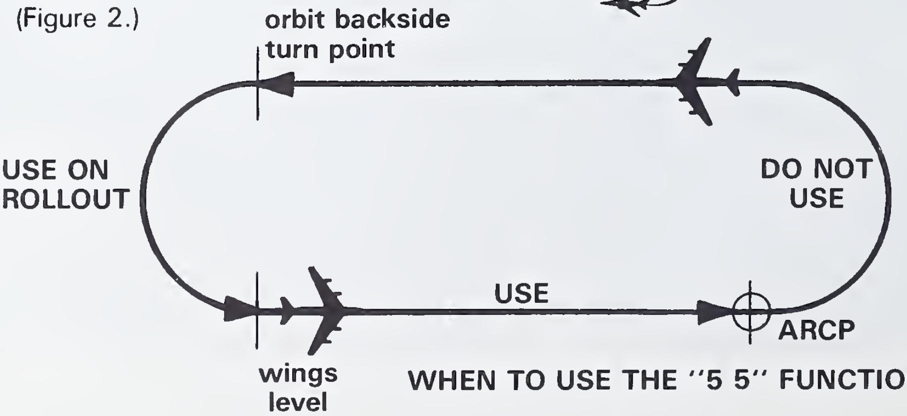
Congratulations, you've done it! A perfect primary rendezvous. It's a good thing the INS was working. Or was it? KC-135 Flight Crew Air Refueling Procedures (T.O. 1-1C-1-3) states "The accuracy of the primary rendezvous equipment should be cross checked with as many other available aids as necessary." Let's look at some simple ways to check the INS for accuracy.

Since the INS in OPS can't be updated by TACAN, it can have an increased drift rate. This could become a factor if there is a long delay at the ARCP waiting for a receiver. One good cross check is to use precomputed radial/DME from a TACAN station for the ARCP and orbit backside turn point. The co-pilot can then use his HSI to check the INS. This same TACAN station can be used throughout the rendezvous for TACAN-aided operation of the DNS. The DNS present position can then be compared to the INS present position as a cross-check.

If the INS has drifted, then the offset could also be wrong. The INS offset assumes that both the receiver and the tanker are exactly on course. If either airplane is off course, the offset will not be correct. Therefore the navigator should use the radar whenever possible to confirm that the proper offset from the receiver is established. A UHF DF hold down can help if the radar is not working.

Of course, the final back-up is to be always mentally prepared to use an alternate method of rendezvous if the INS or A/A TACAN accuracy is suspect. Never assume the INS is correct; prove it is by cross checking with other equipment. Remember, the Air Refueling Manual (T. O. 1-1C-1-3) states, "The tanker is responsible for the successful completion of the rendezvous," and all us "old heads" know what that means: the aircraft commander is ultimately responsible. Spending some time trying these techniques could save you some embarrassing moments trying to explain what went wrong.

(Figure 2.)



WHEN TO USE THE "5 5" FUNCTION

What Did You Expect?

Capt Howard M. Harding
Current Operations, K I Sawyer AFB

It's 1400 on a lovely, balmy Saturday afternoon and I'm in the office writing this article for Combat Crew. Actually, I'm waiting for three tankers to launch on a BUY NONE Support mission. Years ago I found this fascinating, complex, and a new part of the Current Operations (DONO) routine. After several years it is still fascinating and complex. But also: routine.

What about you? Ever take the active at 0-dark-30 on an HHD mission and wonder what you were doing there? What sequence of events and coincidence identified your crew for the mission? Couldn't the show and launch times be a bit more humane? Why wasn't the final mission timing firmed up and available until the pretakeoff briefing? And what are those nummies doing now — the ones who were at the briefing but are not in the aircraft.

Perhaps this article will answer some of these questions. I can only speak of how it happens here at Base X. The system at your wing will be very similar but have distinctive details.

Before the wing was advised of an impending HHD mission, numbered air force either generated the mission by themselves or were tasked to participate in a larger exercise. The lead time for planning a mission increases in a linear manner — add about a week for each additional level of participating headquarters. The difficulty of problem resolution seems to increase by the square of the levels — two levels of headquarters will generate at least four times as much difficulty and delay. Perhaps now you understand why the first answer in Current Operations is always the same: *I don't know, but I will try to find out.*

Let's say the HHD mission involves Sea Surveillance in the Atlantic. When DONO first hears of it, that's where the mission is: "In the Atlantic during the third week of next month." Where, really? When? With what as target or mission objective? All these logical questions are prerogatives of the Navy (another level or two of headquarters). According to management studies: If it is not necessary to make a decision, it is necessary to not make a decision. In mil-speak: preserve your options until the very last minute.

About two weeks before the mission we will learn the rough area and timing parameters (the Navy has figured out roughly where the target will be). DONO provides a rough flight plan (useful if an ALTRV is required), keeps an ear on the telephone for updated information and returns to more current crises. About a week prior to the mission, DONO schedules mission briefings and ground training sessions for the crews. For two days prior to the mission, the crews receive training to insure an effective mission and what to expect in the target area.

"Ever take the active at 0-dark-30 on an HHD mission and wonder what you were doing there?"

It is now three hours prior to launch and time for the pretakeoff briefing. The crews are "proud to be here, grateful for the training." The weather officer has arrived with three-color slides. Intelligence is represented and updates the general situation. Someone from Communications has briefed a new set of frequencies and agencies to contact. And DONO is passing out updated copies of the latest mission timing sheets, ALTRV approvals, mission objectives and requirements. The briefing starts off "on the hack," the crews depart for the flight line, and everyone else goes home for the day . . .Right? Not quite.

If the mission has an ALTRV, the DONO person will be in the command post to coordinate with ARTCC. If there is no ALTRV, the DONO person is in the office catching up on changes to the next HHD mission before the telephone starts to ring. Intel has representatives in the command post to translate and forward encoded messages. And, of course, everyone is trying to get rested up so they can be fresh to second-guess the crew during the Operations debriefing.

In all seriousness, the requirements for what must be accomplished before, during, and after an HHD mission can be found in the regulations maintained by Scheduling, Current Operations, Communications, Intelligence, etc. Remember all those different offices in the wing headquarters building? There's a reason for each one of them. Come sit in the office at DONO and look through our regulations — SACRs 55-3, 55-12, 100-24, and a couple of FAA Handbooks if you've got the stamina. If you're lucky, you might be in the office at the right time to hear one simple telephone call which changes the wing plans for the whole week.

This article has been flowing about long enough. You're as tired of the subject as you were when the mission was over. But there is at least one more step. Get some rest after you land and then go talk about it with DONO. They are required to send an after-action report and can do with your input. Right about here another management principle comes into play: If it ain't broke, don't fix it. The mission was accomplished this time; we'll use the same checklist and procedures next time. In general, DONO will get an answer for your questions and will solve any problem you bring in. But if the mission was successfully accomplished, why would we look for problems? You say you didn't like something or you had a minor problem in one area or another? You think the training should emphasize this or that? A different system might work better? Then take the initiative and close the loop. *If you suck it up, grit your teeth, and don't tell someone there's a problem — next time, What Do You Expect?*

Aircraft Maintenance

TSgt Walter W. Bailey, 42 BMW, Loring AFB, is SAC's Maintenance Airman of the Month. As the NCOIC of the Support Equipment Branch, Sgt Bailey has consistently provided outstanding management and leadership to the repair and operational needs of all non-powered support equipment. Sgt Bailey took a shop which had scored "marginal" and "unsatisfactory" on past MSEP inspections and brought it up to "excellent" and "outstanding" ratings. Among Sgt Bailey's improvements: reorganization of an almost nonexistent supply program, reconstruction of a welding area, construction of a repair and supply bench stock section to completely accommodate all LOX cart needs, and procurement of a liquid nitrogen storage tank and three liquid nitrogen servicing units. Sgt Bailey's superb technical skills, impeccable military bearing, personal appearance, initiative and willingness to accept additional responsibility have made him invaluable to the 42 BMW.

Missile Maintenance

SSgt James E. Bolduc, 394th ICBM Test Maintenance Squadron, Vandenberg AFB, is SAC ICBM Maintenance Airman of the Month. Assigned to the Electro-Mechanical Team Unit, SSgt Bolduc has been the catalyst of a highly successful initial and recurring training program in EMT. Rated outstanding during the latest QC activity inspection and excellent during the SAC IG Management Effectiveness Inspection, SSgt Bolduc's error free training program surpasses all expectations when put to the test. His success can be measured by the 100 per cent pass rate his students have attained during initial and subsequent QC evaluations. SSgt Bolduc maintains qualifications in nearly 95 percent of the electro-mechanical tasks that span three Minuteman weapon systems. This capability is unprecedented throughout the operational wings. During the last 3901st SMES inspection, he was rated highly qualified on an Instructor Proficiency Evaluation and received the SAC ICBM Master Instructor Award.

PROFESSIONAL PERFORMERS

Missile Crew

The 381 SMW, Crew E-021, 1Lt Johnny H. Ramsey, MCCC; 1Lt Melanie A. Campbell, DMCCC; SrA Paul A. Wells, BMAT; and SrA Tony D. Sontag, MFT, McConnell AFB, is SAC's Missile Crew of the Month. While on alert recently, Crew E-021 was managing the activities of 75 maintenance and security police personnel who were conducting a propellant transfer operation. While the maintenance team was performing a PTS pre-inspection, a malfunctioning oxidizer flow pump was discovered. The crew expeditiously and professionally coordinated the efforts of the PTS team and job control with various other base technicians in order to remedy the potentially dangerous situation. Shortly, however, other problems presented themselves. First, fire pump P-1 lighted on the facilities panel control board and could not be pressed off. Then the hard storage tank was discovered overflowing. Using their indepth knowledge and keen understanding of complex equipment, they expertly troubleshot and corrected each problem and prevented possible damage to equipment. At this point, they were presented with yet another problem as the complex experienced a total loss of commercial power. The crew immediately implemented the applicable checklist to transfer the complex to the alternate power source. Through their superb weapon system knowledge and professional performance in the face of simultaneous multiple hazards and complex malfunctions, crew E-021 prevented possible damage to complex equipment, protected the lives of numerous personnel, and maintained the EWO integrity of their sortie.

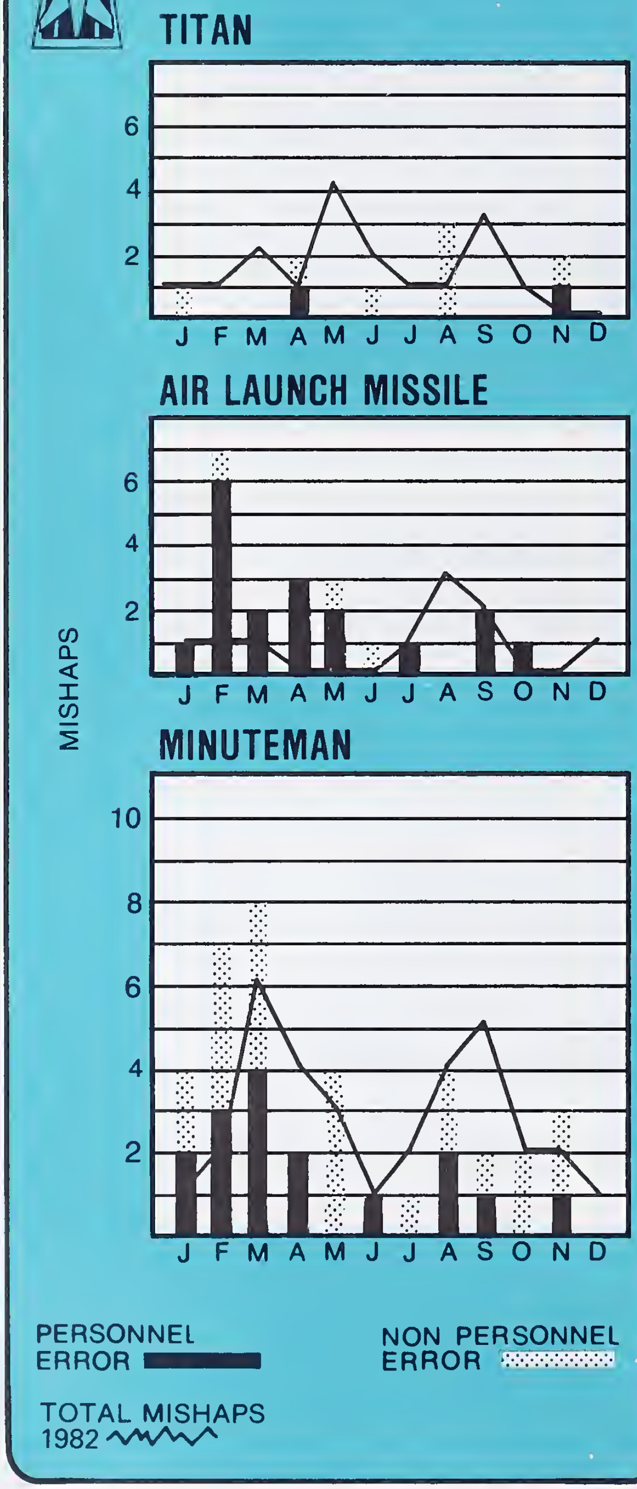
Flying Crew

Crew E-25 of the 60 BMS, Andersen AFB, is SAC's Flying Crew of the Month. Crew E-25 consists of Capt Daniel Aronson, AC; 1Lt William T. Jackson, CP; Capt Monty Valentine, RN: 1Lt Thomas L. Martin, N; 1Lt Paul G. Page, EW; and SSgt George A. Worsham, ADG.

On Oct 18, 1983, Capt Aronson and Crew E-25 were making a maximum gross weight takeoff from Mather AFB on a ferry flight taking a B-52G model to their home base, Andersen AFB, Guam. Capt Aronson felt that the takeoff had been normal, but as they climbed out the supervisor of flying at Mather called to inform them that rubber and metal had been found on the runway after their takeoff. All gear indications inside the cockpit gave normal indication of gear up and a good hydraulic system. During the ensuing 12 hour flight to Andersen they consulted the technical manuals and decided that a visual inspection of the gear was necessary prior to extension to preclude additional damage during the extension sequence. On arrival in Guam Center's airspace they coordinated with air traffic control to descend to 5000 ft MSL. At this altitude, with all gear and bomb door circuit breakers pulled, Sgt Worsham volunteered to crawl back and check the gear. As he returned back to the crew compartment he reported that the outside tire on the right rear had lost all of its tread and punctured the gear door. He also reported that all hydraulic lines were undamaged. In this situation the dash one advises the aircraft be landed with that particular gear retracted. Following the emergency procedures they pulled all circuit breakers for the right rear gear in order to keep it retracted, and proceeded to burn down fuel. With 20,000 pounds of fuel remaining, Capt Aronson started his final precision approach to landing. The approach was perfect and the initial touchdown was accomplished on one aft truck at the lowest possible sink rate. Using minimum braking, Capt Aronson allowed the aircraft to roll to a stop at the end of the runway. At this point the gear was pinned and the aircraft turned over to maintenance. Capt Aronson and Crew E-25 handled this serious emergency with superior crew coordination, following tech order procedures and recovering the aircraft safely.

1983

Space & Missile Mishap Experience



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what your pressure altimeter was reading when the RN first advised you of the elevation of the high terrain. A quick mental subtraction of one from the other compared to your known climb capability will tell you at what range you should begin your climb. For "G" model drivers, if the difference between the pressure altimeter reading and the terrain elevation is 3000 start taking the climb command in profile 6 at six mile range, then go to profile 3 thirty seconds later. When dropout occurs as you enter the short range blind zone, hold pitch attitude till the radar altimeter indicates crossover. If the difference between your pressure altitude and the terrain elevation worked out to more than 3000 feet you can use this as the basis for starting climb earlier. By the same token if the difference worked out to less than 3000 feet you can start climb later. By interpolation, if the difference works out to 1500 feet or less you may be able to stay in profile 3 for the entire crossing. Bear in mind however, that unless you can confirm the height of the terrain by the use of the EVS monitor, the best practice is to always check profile 10 and profile 6 as you approach high terrain in order to confirm the elevation values the RN gave you. In EWO conditions this would be a must. The whole idea of this technique is to let you take the maximum advantage of the terrain by flying as closely as possible to programmed altitudes. Don't forget your option, with your navigation team's coordination and approval, to deviate from course for terrain masking. After your successful crossing your pre-flight planning will tell you what's ahead and below you — another ridge or a valley floor. Until you get a good trace again call for the next appropriate terrain elevation, **and be specific.** If you are descending into a valley, ask for the floor elevation. If you are descending into a range of hills, ask for elevation of the ridgeline. Use established EVS aided descent techniques until the trace becomes reliable. If the terrain elevation you are using is accurate, the radar altimeter will begin to confirm this fact as your descent continues. You can then begin to cross-check the trace, radar altimeter, and the pressure altimeter in order to initiate a safe and timely level off.

These suggested techniques require constant practice if they are to be used with confidence. Discipline yourself to concentrate on the cockpit indicators, and on the navigator provided information. Let the pilot not flying worry about looking out the window. **That's his job — make sure he does it.** I know that the exhortation to keep your attention on the trace and the EVS monitor may be impossible to comply with completely, but at least keep your one-eyed TA flying down to a minimum. It is more fun and comforting to watch the scenery float by, but who ever said this was supposed to be fun or comforting? You will emerge from your concentrated practice as a skilled TA flyer, and as far as terrain avoidance is concerned, that's as fun as it gets.

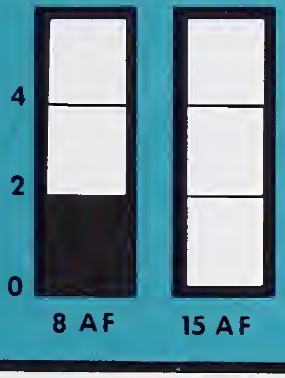
FLY THE AIRCRAFT

SAC'S TEN YEAR FLYING SAFETY RECORD

CLASS A FLIGHT MISHAPS

YEAR	73	74	75	76	77	78	79	80	81	82	83
TOTAL MISHAPS	5	8	4	4	4	1	5	4	4	2	2
FLYING HOURS 100,000	6.1	5.1	4.2	3.9	3.7	3.6	3.6	3.4	3.5	3.5	3.0
FATALITIES	0	14	7	22	10	5	7	2	14	9	7
RATE	.82	1.6	1.0	1.0	1.1	.28	1.4	1.2	1.2	.58	.65*

*Estimated Rate based on 310,000 Flying Hours



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NOV FLYING HOURS

302206

1983 FLYING HOURS

APRIL	B-52G
JUNE	FB-111A

1983 MISHAP STATS

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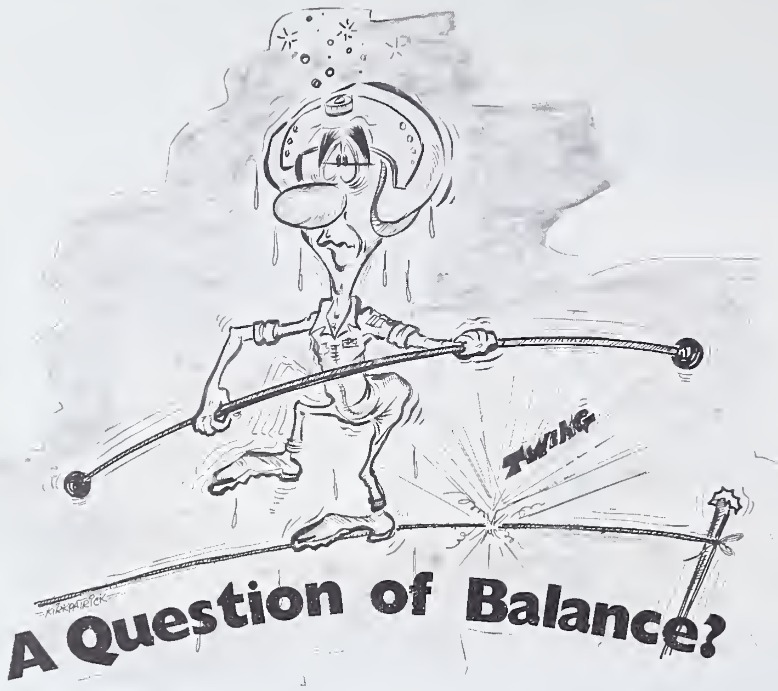
to the MDA by the VDP). Let's take a look at the localizer to runway 35." (figure 2.)

IP: "You can PLAN and BRIEF the descent gradient, descent rate, and the pitch change required to get you from the FAF altitude to the MDA by the VDP — ON MISSION PLANNING DAY. To do that, all you have to do is divide the altitude to lose by the distance (just like in your Center-directed descent point problem). The altitude to lose is 2500FT (at the FAF) — 1300FT (MDA) = 1200FT. The FAF is at 6 DME, the VDP is at 2 DME. So, 6 - 2 = 4NM (distance to descend). To find your descent gradient, remember, you divide: $\frac{1200FT}{4NM}$ = 300FT/NM, or 3°.

And, remember, to find your VVI just multiply your gradient in FT/NM times your ground speed in NM/MIN. You've already figured out your gradient: 300FT/NM. You should know about how much fuel you are planned to get back to base with, so you can figure a no-wind ground speed. Let's say you get back at 290,000 lbs gross weight; your best flare speed is 140 KIAS. Best flare plus 10 is 150 KIAS, so your no-wind ground speed is about 2½NM/MIN; therefore, if VVI = Ground Speed X Gradient, then: 2½NM/MIN X 300FT/NM = 750FT/MIN. If you brief all of this at mission planning, and make minor corrections for actual winds when you fly, you'll fly more precise instruments AND the Nav Team can better back you up on the approach." The IP looked around the table. The entire crew seemed to think all of this made sense, except the EW, who was checking his watch to see if he could still get in nine holes. The IP felt pretty Sierra Hotel about all the "good poop" he'd just disseminated. As he headed for the mission planning room door, he overheard another in-progress mission briefing: ". . . and when we get back to 'the Forks' we'll shoot an enroute descent. If you'll open the high book to page 49, I'll brief the High ILS *penetration* to . . .



A Question of Balance?

Col David O. McClure
Deputy Commander for Operations
351 SMW, Whiteman AFB

Everybody in today's Air Force must maintain a balance among three important interrelated aspects of his or her life. The right mixture of job performance, support to one's family, and commitment to one's personal faith allow a person to become a true Air Force professional.

The responsibility to commit ourselves to our assigned duties is no less great for those of us performing a service to other Air Force personnel — such as finance, supply issue, or transportation, to name a few — than it is for those who put their life on the line during combat. While you are on duty, literally "be on duty." Work at your assigned tasks, striving to be the best your capabilities allow.

Spend the first few months of your job training and learning every aspect of the job no matter how fine the detail may seem at the time. There are too many cases where people lost their lives simply because of lack of attention to detail. We can't afford to blindly march on without learning from history.

Once you know your job and all its peculiarities, then perform that job to the fullest. Set some achieveable goals for yourself, strive to meet and perhaps exceed those goals. By all means, take pride in a job well done.

To be a major league baseball player, you must first develop your skills, then while on the field of play, you must have total concentration on the game. You must constantly be thinking of the situation and what to do if the ball is hit to your position.

Other jobs are very similar. To be a "major leaguer," you must develop your skills and then participate to the fullest while in the game — "work."

For truly enhanced performance, you must make decisions and accomplish work based on two very important guidelines — complete integrity and concern for fellow workers.

When you are the best performer you know how to be, let that same attitude prevail in your family life. Leave office work at the office and dedicate time to your family to their (and your) growth. Decisions should be tempered with "Is this the best for my family?" Get the family involved with family activities — scouts, sports, recreation, etc. A family that plays together, stays together.

Most importantly, be concerned for your children's education and health. Learn to spot trouble in these areas before they get out of control. Have family conferences set aside one night a week for a family project. The same applies as you build your "family" on the job — when you are the supervisor/commander/leader.

One third important area is one's own inner beliefs or faith in a higher being. Being dedicated to a belief in God and having a moral value system is probably the reason why you do so well in the other two areas.

Like a tripod needs three equal legs for stability, a person needs the proper balance of these virtues to be a **"professional."** Remember, service to humanity is the best work of life! And we know the Air Force serves by helping to maintain freedom for others. By dedicating yourself to your job, your family, and your own inner faith, you will truly be a dedicated servant — an Air Force Professional.

SAC SAFETY SCREEN

325 BMS, Fairchild Crew R-12: MP Capt Richard A. Lieber, MC 1Lt Vincent B Yasay Jr, MR Maj William H Barkley, MN 1Lt Jeffrey M Ortiz, ME 1Lt James P Ferguson, MG SSgt David G Stockdale

909 AREFS, Kadena Crew R-122: AC Capt Charles M Seigler, CP 1Lt Mary C Muehlbauer, NN 2Lt Timothy J Casey, BO SSgt Albin King

43 AREFS, Fairchild Crew R-131: P Capt Jerome W Voight, CP 1Lt Todd Keegan, N 1Lt Tracey E McFadden, BO Sgt Michael V Cordell

43 AREFS, Fairchild Crew R-121: P Capt William L Craine, CP 1Lt Steven W Machtwey, N 2Lt David A Biggs, BO A1C William C Brown Jr

931 AREFG, Grissom Crew: AC Maj William A McLoughlin, CP Capt Maurice W Calle, N Maj John P Kjeldsen, BO TSgt Michael A Moore

128 ARG, Gen Mitchell Fld, Milwaukee, WI: P Capt Scott W Russell, P Maj Robert J Saggau, IN Lt Col Jean R Price, IBO MSgt Richard H Harvey

509 AREFS, Pease Crew R-123: P Capt John P Smallwood. CP Lt Mark L Spezia, N Capt Michael L Stiers, BO Sgt Daryl R Pettis

509 AREFS, Pease Crew R-121: P Capt Robert D Fleury, CP Capt Richard D Grossman, N Lt Brad C Angus, BO SSgt Lisa M Class

69 BMS, Loring Crew S-30: IP Maj David F Slaughter, CP Capt Mark K Simmons, CP 2Lt David F Gregg, IRN Capt Michael D Hagen, N 1Lt Thomas A Powell, IEWO 1Lt James N Gapinski, G A1C Douglas L Overly

42 AREFS, Loring Crew E-113: IP Capt Robert J Goodman, CP Capt Michael F Clover, IN Capt Karol R Wojcikowski, BO SSgt Douglas D Simmons

407 AREFS, Loring Crew R-182: P Capt Norris D Shane, CP 1Lt Maureen R Davis, N 1Lt David A Mansfield, BO Sgt Colton M Crowder

11 AREFS, Altus Crew R-114: AC Capt Christopher Baum, CP Capt Catherine D Smith, N 1Lt Alejandro Lagerejos, IBO Sgt James H Morman

644 BMS, K I Sawyer Crew E-13: FP Capt S Keith, CP 1Lt J Arancio, RN Capt G Lynn, NN 1Lt F Gowans, NE 1Lt H Kinsey, AG SrA M Roy

381 SMW, Little Rock Crew R-101: MCCC 1Lt Lloyd D Darr, DMCCC Capt Linda M Jones, MFT Sgt Ronald E Hornsby, MSAT A1C Todd K Harter, MSAT A1C Gene A Rynkewicz

351 SMW, Whiteman Crew R-010: MCCC Capt Roger A Mature, DMCCC 2Lt Eric L Frattini

90 SMW, F E Warren Crew E-003A: MCCC 1Lt Walter B Harvey, DMCCC 2Lt Arthur B Dolinger Jr

91 SMW, Minot Crew R-054: MCCC Capt James E Bennett, DMCCC 2Lt John H Burling

321 SMW, Grand Forks Crew R-042: MCCC Capt Paul K Mattingly, DMCCC 1Lt Richard T Walker

341 SMW, Malmstrom Crew R-193: MCCC 1Lt Donald E Weter, DMCCC 2Lt Mark F Yovish

22 AREFS, March Crew S-102: IP Capt Michael S Lucchesi, CP Capt David B Guertin, IN Capt Gary M Ardo, IBO TSgt Erskin D Glast

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